REMARKS

Claims 1-10 and 23-32 remain pending in this application. Independent claims 1 and 23 have been amended to specify that the annular shim member is "substantially planar." Support for these amendments can be found in the Specification at, for example, page 4, lines 4-5, and Fig. 3B.

Objections to the Specification

The Specification has been amended to more properly specify the term "INCONEL" as a registered trademark of Special Metals Corporation of Huntington, WV, and to add appropriate generic terminology ("a nickel-chromium-based alloy"). The term "Inconel alloy," as used in the Specification as filed, is well known in the art as referring to a family of nickel-chromium-based alloys produced by Special Metals Corporation. (See Exhibit A, attached hereto). The Specification has been amended to clarify that the term "Inconel alloy" refers to a nickel-chromium-based alloy of the type sold under the INCONEL® name. No new matter has been added.

The objections to the Specification for failure to provide proper antecedent basis are traversed on the grounds that the Specification provides proper antecedent basis for the subject matter at issue. With respect to the wire mesh having an open area of about 20% to about 80%, reference is made to page 8, lines 9-11 of the Specification. With respect to the wire mesh having a thickness of about 1 mm, reference is made to page 9, lines 7-9 of the Specification. With respect to the metallic material being a refractory material, the Specification has been amended at page 8,

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

following line 16, to specify that the metallic material can be a refractory material. Support for this amendment is found in the claims as filed. (See original claims 4 and 14). No new matter has been added.

Indefiniteness Rejections

Claims 5-7, 9, 10, 27-29, 31 and 32 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 5 and 27 have been amended to remove the trade name "Inconel," and to add the generic terminology of "a nickel-chromium-based alloy." With these amendments, it is believed the indefiniteness rejections of these claims are overcome.

With respect to the rejections of claims 6, 7, 9, 10, 28, 29, 31 and 32, these claims were all found to be indefinite because they include the term "about," and the Examiner asserts that the prior art is "close."

As the case law and the MPEP make clear, it is entirely proper to use the term "about" in patent claims, so long as one skilled in the art is "reasonably apprised of the scope of the invention." See MPEP § 2173.05(b) ("[A]s a general proposition, broadening modifiers are standard tools in claim drafting…").

In rejecting the present claims, the Examiner appears to be relying on *Amgen, Inc. v. Chugai Pharmaceutical Co.*, 18 USPQ2d 1016 (Fed. Cir. 1991), which held that the term "at least about" was indefinite where there was "close prior art." In that case, however, the only point of novelty between the patent claims and a prior art reference was a limitation that the specific activity of

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

the claimed compound was "at least about 160,000." Furthermore, the district court found that "bioassays provide an imprecise form of measurement with a range of error" and that use of the term "about" 160,000, coupled with the range of error already inherent in the specific activity limitation, served neither to distinguish the invention over the close prior art (which described substances with a specific activity of 120,000), nor to permit one to know what specific activity values below 160,000, if any, might constitute infringement. Therefore, under those facts the district court held, and the CAFC affirmed, that the claims at issue did not reasonably apprise those skilled in the art as to their scope.

In the present case, as discussed in greater detail below in addressing the 102/103 rejections, the prior art is not even remotely "close" with respect to the limitations in question. Moreover, unlike in *Amgen*, the limitations at issue here are not the sole point(s) of novelty relative to the prior art. Thus, even if the prior art was "close" with respect to these particular limitations, the claims as a whole are patentably distinct for a variety of reasons discussed below.

Moreover, the nature of the limitations at issue here lend themselves to a clear and ready assessment of infringement. See, for example, *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 301 (Fed. Cir. 1983), in which the court held that a limitation defining the stretch rate of a plastic as "exceeding about 10% per second" is definite because infringement could clearly be addressed through the use of a stopwatch. The limitations at issue here, which relate to well-known and well-

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

understood parameters such as the open area of a mesh, effective thickness, ratio of mesh thickness to wire diameter, and temperature, can all also be likewise readily assessed. It should be noted the *Amgen* decision expressly disclaims any global rejection of "about" as indefinite, and states that the term can indeed be acceptable in appropriate fact situations. Furthermore, the case law holds that absolute mathematical precision is not a requirement for definiteness under 35 U.S.C. § 112, second paragraph.

Accordingly, it is submitted that the indefiniteness rejections of claims 6, 7, 9, 10, 28, 29, 31 and 32 were improper and should be withdrawn.

Anticipation and Obviousness Rejections

In the Office Action, claims 1-10 and 23-32 were rejected for anticipation under 35 U.S.C. § 102(b), or in the alternative, for obviousness under 35 U.S.C. § 103(a), in view of 3,958,840 to Hickox *et al.* ("Hickox"). Claims 4, 5, 7, 26, 27 and 29 were also rejected as being obvious over Hickox in combination with 4,304,178 to Haberle ("Haberle").

Independent claim 1 is directed to an annular shim member having first and second opposing surfaces and a plurality of openings formed therethrough, wherein the member is made from a metallic material and at least partly defines a plurality of radially extending gas flow paths for communicating a radially interior side of the member with a radially exterior side of the member. Claim 1 further specifies that the annular shim member is "substantially planar."

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

Independent claim 23 is directed to an annular shim member having first and second opposing surfaces and a plurality of openings formed therethrough, wherein the member is made from a metallic material and at least partly defines a plurality of radially extending gas flow paths, the annular shim member being substantially planar.

The primary Hickox reference describes a flexible bearing 5 made of alternate rigid shims 6 and elastomer layers 7 stacked and bonded together. The elastomer layers 7 have intermediate layers 8 of open-weave reinforcing means.

Although the Office Action does not clearly describe how the Hickox reference allegedly anticipates each element of the present claims, the applicant's understanding is that the Examiner is relying on the isolated teaching of the reinforcement layer 8 embedded in elastomer layers 7, particularly where the reinforcement is a wire screen 9, as corresponding to the presently-recited annular shim. It further appears that the openings in the mesh screen itself are asserted as corresponding to the presently-recited radially extending gas flow paths.

However, even assuming the Examiner's assertions are correct, the Hickox reference nevertheless fails to disclose a "substantially planar" shim, as presently claimed. Hickox discloses a frusto-conical annular wire screen, and nothing in the prior art teaches or suggests modifying Hickox as would be required to arrive at the present invention. In fact, Hickox teaches a particular type of bearing, intended for use as a flexible joint between a rocket case and a movable thrust nozzle,

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

and in which the layers conform to surfaces of concentric spheres. (See, e.g., col. 1, lines 37-51; col. 2, lines 50-58). Thus, Hickox actually teaches away from the present "substantially planar" annular shim.

Moreover, even if the screen 9 in Hickox were made planar, there would still be no radially extending gas flow paths as claimed. As can be clearly seen in Fig. 3 of Hickox, all of the segments of the mesh 9 are welded at intersections 4, and offer no pathways for gas above or below the wires of the mesh. In addition, as described in col. 3, lines 26-40, Hickox teaches that a "valuable and unexpected result" of the method of manufacturing the flexible bearings is that "the layers 7 of elastomer extrude through the openings in the screen or cloth reinforcing layers and weld together." Thus, there are clearly no gas flow paths in the Hickox bearing, since the adjacent elastomer layers extrude into any openings and weld together, and Hickox therefore further teaches away from the present invention.

Accordingly, claims 1 and 23 as amended are patentable over the prior art of record, as are the claims depending therefrom.

In addition, dependent claims 8 and 30, reciting crimped weave mesh, are patentable in their own right. Hickox fails to teach a crimped weave mesh, and therefore the claimed invention is not anticipated thereby. To the extent that Hickox is allegedly "only slightly different" than the claimed invention with regard to a crimped weave mesh, it is still the Patent Office's burden to establish *prima facie* obviousness, which was not done in this case. Moreover, the Examiner's reference to product-by-process

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

claims is inappropriate here and irrelevant. A "crimped" wire is a structural recitation, and not a process limitation.

With respect to claims 9 and 31 and 10 and 32, the Examiner's assertion that the prior art "appears to inherently" possess or be capable injects a degree of doubt in the teachings of the prior art that by definition prevents a conclusion of inherent disclosure. "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic <u>necessarily</u> flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

The deficiencies with respect to the Hickox reference are not overcome by the secondary reference to Haberle, which relates to temperature-controlled presses having cup-shaped spacers, and is cited for disclosing stainless steel and a press plate having a thickness of 5 mm. However, even when Haberle is considered in combination with Hickox, there is still no suggestion or motivation to provide the annular shim members of the present claims.

In view of the above, it is submitted that all claim rejections are overcome, and that claims 1-10 and 23-32 are allowable.

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

KENNY CHANG

Dated: April 29, 2009

By: /Charles L. Gagnebin iii/
Charles L. Gagnebin, III
Registration No. 25,467
Attorney for Applicant(s)

WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
Ten Post Office Square
Boston, MA 02109
Telephone: (617) 542-2290
Telecopier: (617) 451-0313

CLG/nja

379681.1

EXHIBIT A

Inconel

From Wikipedia, the free encyclopedia

Inconel is a registered trademark of Special Metals Corporation that refers to a family of austenitic nickel-chromium-based superalloys [1]. Inconel alloys are typically used in high temperature applications. It is often referred to in English as "Inco" (or occasionally "Iconel"). Common trade names for Inconel include: Inconel 625, Chronin 625, Altemp 625, Haynes 625, Nickelvac 625 and Nicrofer 6020.[2]

Contents

Composition

Different Inconels have widely varying compositions, but all are predominantly nickel, with chromium as the second element.

Inconel	Element (% by mass)														
	Nickel	Chromium	Iron	Molybdenum	Niobium	Cobalt	Manganese	Copper	Aluminium	Titanium	Silicon	Carbon	Sulfur	Phosphorus	Boron
600 [3]	72.0	14.0-17.0	6.0-10.0				1.0	0.5			0.5	0.15	0.015		
625 [4]	58.0	20.0-23.0	5.0	8.0-10.0	3.15-4.15	1.0	0.5		0.4	0.4	0.5	0.1	0.015	0.015	
718 [5]	50.0-55.0	17.0-21.0	balance	2.8-3.3	4.75-5.5	1.0	0.35	0.2-0.8	0.65-1.15	0.3	0.35	0.08	0.015	0.015	0.006

Properties

Inconel alloys are oxidation and corrosion resistant materials well suited for service in extreme environments. When heated, Inconel forms a thick, stable, passivating oxide layer protecting the surface from further attack. Inconel retains strength over a wide temperature range, attractive for high temperature applications where aluminum and steel would succumb to creep as a result of thermally-induced crystal vacancies (see Arrhenius equation). Inconel's high temperature strength is developed by solid solution strengthening or precipitation strengthening, depending on the alloy. In age hardening or precipitation strengthening varieties, small amounts of niobium combine with nickel to form the intermetallic compound Ni_3Nb or gamma prime (γ'). Gamma prime forms small cubic crystals that inhibit slip and creep effectively at elevated temperatures.

Machining

Inconel is a difficult metal to shape and machine using traditional techniques due to rapid work hardening. After the first machining pass, work hardening tends to elastically deform either the workpiece or the tool on subsequent passes. For this reason, age-hardened Inconels such as 718 are machined using an aggressive but slow cut with a hard tool, minimizing the number of passes required. Alternatively, the majority of the machining can be performed with the workpiece in a solutionised form, with only the final steps being performed after age-hardening. External threads are machined using a lathe to "single point" the threads, or by rolling the threads using a screw machine. Holes with internal threads are made by welding or brazing threaded inserts made of stainless steel. Cutting of plate is often done with a waterjet cutter. Internal threads can also be cut by single point method on lathe, or by threadmilling on a machining center. New whisker reinforced ceramic cutters are also used to machine nickel alloys. They remove material at a rate typically 8 times faster than carbide cutters.

Joining

Welding inconel alloys is difficult due to cracking and microstructural segregation of alloying elements in the heat affected zone. However, several alloys have been designed to overcome these problems. The most common way to weld inconel is by using a TIG welder with the appropriate filler metal.

New innovations in pulsed micro laser welding have also become more popular in recent years.

Uses

Inconel is often encountered in extreme environments. It is common in gas turbine blades, seals, and combustors, as well as turbocharger rotors and seals, high temperature fasteners, chemical processing and pressure vessels, heat exchanger tubing, steam generators in nuclear pressurized water reactors, natural gas progressing with contaminants such as H_2S and CO_2, firearm sound suppressor blast baffles, and Formula One exhaust systems.[6][7][8] Inconel is increasingly used in the boilers of waste incinerators[9].

North American Aviation constructed the skin of the X-15 rocket plane out of an Inconel alloy known as "Inconel X".[10]

Inconel alloys

- Inconel 600: Solid solution strengthened

- Inconel 625: Acid resistant, good weldability
- Inconel 690: Low cobalt content for nuclear applications
- Inconel 718: Gamma double prime strengthened with good weldability
- Inconel 751: Increased aluminum content for improved rupture strength in the 1600 F range[11]
- Inconel 939: Gamma prime strengthened with good weldability

References

1. ^ High-Performance Alloys (http://www.specialmetals.com/products/index.php) , Special Metals Corporation
2. ^ Special Alloys (http://www.source1alloys.com/alloys/Inconel_625.html) , Source 1 Alloys
3. ^ INCONEL alloy 600 (http://www.specialmetals.com/documents/Inconel%20alloy%20600%20(Sept%202008).pdf) , Special Metals Corporation
4. ^ INCONEL alloy 625 (http://www.specialmetals.com/documents/Inconel%20alloy%20625.pdf) , Special Metals Corporation
5. ^ INCONEL alloy 718 (http://www.specialmetals.com/documents/Inconel%20alloy%20718.pdf) , Special Metals Corporation
6. ^ Power Generation (http://www.specialmetals.com/power.php) , Special Metals Corporation.
7. ^ Chemical Processing (http://www.specialmetals.com/chemical.php) , Special Metals Corporation.
8. ^ About Good Fabrications (http://www.goodfabs.com/about.htm) ("Performance inconel exhaust manufacturers for racecars").
9. ^ Inconell - state-of-the-art corrosion protection (http://www.volund.dk/content/download/531/2353/file/Inconel_eng_pdf.pdf) by Babcock & Wilcox Vølund, 2003
10. ^ Robert S. Houston, Richard P. Hallion, and Ronald G. Boston, EDITOR'S INTRODUCTION, "Transiting from Air to Space: The North American X-15" (http://www.hq.nasa.gov/office/pao/History/hyperrev-x15/ch-0.html) , *The Hypersonic Revolution: Case Studies in the History of Hypersonic Technology*, Air Force History and Museums Program, 1998. NASA.gov.
11. ^ INCONEL alloy 751 (http://www.specialmetals.com/documents/Inconel%20alloy%20751.pdf) , Special Metals Corporation

Retrieved from "http://en.wikipedia.org/wiki/Inconel"
Categories: Nickel alloys | Superalloys
Hidden categories: All articles with unsourced statements | Articles with unsourced statements since March 2007